Programme Specification – Collaborative Provision

BENG (HONS) DECOMMISSIONING AND WASTE MANAGEMENT (TOP-UP) (NON-APPRENTICESHIP)

Institute of Engineering, Computing and Advanced Manufacturing

Academic Level:	6	**Credits:**	120
UCAS Code:	N/A		
Awarding Body:	University of Cumbria		
Delivered by:	Lakes College West Cumbria		
Delivery Site:	Lakes College West Cumbria		
Programme Length:	PT (2 years)		
Mode of Delivery	Face-to-face		
Pattern of Delivery:	Part-Time		
	Total weeks of study:	60 weeks	
	Delivery pattern:	4 x 15-week semesters	
	Standard semester dates:	No	
PSRB:	Institute of Measurement and Control (InstMC), Society of Operations Engineers (SOE). Upon completion of the top-up honours degree, you will have met the academic requirements to meet the Further Learning required for IEng.		
	Date of accreditation: TBC	Accreditation period: TBC	
Programme Webpage:	TBC		

Entry Criteria
The entry requirements are aligned to the University of Cumbria's admissions criteria. For APL, please refer to the University website.

You will be interviewed to assess your suitability for the course. Entry requires are as a minimum 240 credits which must include 120 credits at level 5. Direct entrance can be achieved with a Foundation Degree in Decommissioning & Waste Management, a Foundation Degree in Plant Engineering (Nuclear Technology pathway) or a HND in Nuclear Engineering. Entry to the course can be via a Foundation Degree or HND without a mapped profile if a course of bridging studies over 1 semester is undertaken prior to entry. An ideal entry will be a Foundation Degree listed above at Merit level.

PROGRAMME AIMS AND OUTCOMES

Programme Aims

By the end of this programme, you will be able to:

1. Assimilate a coherent body of knowledge appropriate to Decommissioning and Waste Management using a range of learning strategies
2. Work in a professional and ethical manner as described with the Engineering Council's Accreditation of Higher Education Programmes (AHEP4) in engineering, in line with the UK Standard for Professional Engineering Competence (UK-SPEC) and the Nuclear Institutes Nuclear Delta
3. Innovate and develop original concepts to define solutions for nuclear clean, plant decommissioning and nuclear waste processing problems
4. Develop observation, reasoning, reflection and analytical thinking powers to enable the embedding of nuclear work-ready behaviours which are essential for working within the highly regulated nuclear industry
5. Apply complex technology processes and procedures to solve unique but real decommissioning and waste management problems
6. Utilise technical systems, management techniques and innovative design solutions for the development of processes and procedures to enable the successful decommissioning of nuclear assets and the subsequent waste management
7. Apply technical knowledge and skills that will prepare you to be a nuclear professional and ready and to work within a highly regulated nuclear environment
8. Work and/or lead a team effectively when applying specialist skills in Decommissioning and Waste Management activities and projects

Programme Outcomes – Knowledge and Understanding

The programme provides opportunities for you to develop and demonstrate the following:

K1. Knowledge of complex scientific principles underpinning relevant technologies that utilised within the context of nuclear decommissioning and waste management

K2. Ability to analyse and apply a range of mathematical techniques to support the innovative requirements of bespoke solutions within nuclear decommissioning and waste management activities

K3. Knowledge to enable the design of innovative solutions to nuclear decommissioning and waste management problems that are found within real nuclear clean up scenarios

K4. Ability to analyse, review and model technical systems in order to bring about continuous improvement within the nuclear decommissioning and waste management process

K5. Ability to utilise computer software to solve problems relevant to Decommissioning and Waste Management

K6. Ability to analyse, apply and develop a systems approach to engineering to solve unique problems within nuclear decommissioning and waste management

K7. Analytical thinking skills to undertake a design process when determining solutions according to customer and user needs

K8. Ability to develop unique system designs to meet a specification by following industrial standard design life cycles

K9. Ability to analyse, critically appraise and apply the results of research and information gathering to propose solutions to nuclear decommissioning and waste Management problems

K10. Interact, support and manage relationships with relevant stakeholders whilst applying commercial and business acumen, business improvement, and project management techniques within a nuclear context

Programme Outcomes – Skills and Other Attributes

The programme provides opportunities for you to develop and demonstrate the following:

S1. Ability to review, appraise, select and use relevant equipment, tools, processes and procedures to support decommissioning and waste Management activities

S2. Analytical practice and development within a workshop and laboratory relevant to decommissioning and waste management

S3. Ability to analyse and review information from technical literature and other sources to support project and professional activities

S4. Ability to demonstrate professional behaviours and codes of conduct and utilise industry standards relevant to decommissioning and waste management

S5. Ability to analyse, record and draw conclusions from data and experimental evidence and manage the presentation of findings.

S6. An ability to analyse and apply complex theoretical concepts to the varying technical requirements of decommissioning and waste management to real work scenarios

S7. Creativity and innovation in both a practical and theoretical context relating to decommissioning and waste management

S8. Ability to manage the successful outcome of nuclear decommissioning and waste management projects.

S9. A logical approach to implementing methods of determining the root cause of problems and demonstrating knowledge of learning from experience (LFE) processes.

S10. Manage quality processes and procedures to ensure continuous improvement

S11. A professional approach to developing and writing technical reports that meet business requirements including the optimisation and continuous improvement of processes and services.

S12. Ability to analyse and apply the results of research and information gathering to evaluate and to propose solutions to a particular application.

PROGRAMME FEATURES

Programme Overview

The degree will provide learners with the opportunity to study 80 credits of academic modules within year 1 and 40 credits of industrial based dissertation in year 2.

The programme has been designed and referenced to the QAA Subject Benchmarking Statement for Engineering (2023) and other academic standards. The programme has been developed with the assistance of a range of local employers to ensure it meets the needs of the region.

This programme is part of a suite of degrees which have been developed to meet the need for Nuclear Engineers and Scientists as identified within the Governments Nuclear skills Strategy Document and sanctioned by the National Curriculum and Qualification Advisory Group for Nuclear (CQAG). The need for Nuclear Engineers and Scientists is now an urgent requirement particular within the new nuclear infrastructure projects across the country which include new build nuclear power, decommissioning and waste management and the development of small scale modular reactors.

The programme has been designed to provide a progression pathway from a Foundation Degree with a suitable module profile. The programme also provides a unique learning experience and delivery will occur within the National College for Nuclear – Northern Hub building. The course delivery model will make significant use of experiential learning and delivery methods which can be defined as 'learning from doing'. Considerable use will be made of the project/technology centre supported by a virtual reality suite which will provide the students with a real time immersed experience. Practical equipment also includes industrial radiological equipment and robotics.

The course will be delivered on a block release basis which will provide an opportunity to undertake enhanced practical activities supporting technical theoretical delivery methods and embedding theoretical knowledge through experience, observation and reflection.

The course also consists of a professional development module and an industrial based dissertation. These modules provide an opportunity to further embed experiential learning within an industrial environment. Learners who are not in relevant employment will be provided with industrial based case studies and details of associated professional work practices and procedures. A range of industrial scenarios will also be provided with research topics providing these learners with an opportunity experience virtual professional development mapped to the Engineering Council UK SPEC.

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Learning and Teaching

The ethos of this programme is to prepare and enhance the students' ability to work within industry in terms of knowledge, skills and behaviours. The course has therefore been designed to fit with this strategy and has been structured to provide a natural means of embedding 'Experiential Learning' where appropriate into the curriculum in terms of content, delivery and assessment.

The programme of teaching and learning is designed to enable the student to demonstrate the attainment of the stated learning outcomes of the programme and assessment strategies are as such matched to these outcomes. The student will be supported in a progressive acquisition of

subject knowledge and skills, gradually advancing towards more independent learning whilst developing a reflective approach to personal progress.

Elements of experiential learning will support students in applying their knowledge and conceptual understanding to real-world problems or situations where the lecturer directs and facilitates learning. Classroom, laboratory and virtual reality facilities will serve as a setting for embedding activities such as case and problem-based studies, guided inquiry, simulations, experiments and projects.

The students will be given opportunities to learn in authentic situations which will make learning becomes more powerful.

By engaging in formal, guided, authentic, real-world experiences the programme will enable the students to:

- deepen their knowledge through acting and then reflecting on this action
- develop skills through practical application and reflection
- support the construction of new understandings when placed in novel situations
- extend their learning as they bring their learning back to the academic classroom environment

Students will be provided with opportunities for practice and feedback, this process of practice and feedback provides a link to 'learn from experience' which is an important behavioural requirement of the nuclear industry. The programme will provide an integration of:

- Knowledge — the concepts, facts, and information acquired through formal learning and past experience
- Activities — the application of knowledge to "real work" scenarios where appropriate and the synergetic integration of work-based activities with academic studies
- Reflection—the analysis and synthesis of knowledge and activity to create new knowledge Content and assessment will provide students with experiences that are carefully chosen for their learning potential (i.e. whether they provide opportunities for students to practice and deepen emergent skills, encounter novel and unpredictable situations that support new learning, or learn from natural consequences, mistakes, and successes).

Throughout the programme, the learner will be actively engaged in posing questions, investigating, experimenting, being curious, solving problems, assuming responsibility, being creative, and constructing meaning, and is challenged to take initiative, make decisions and be accountable for results.

The programme will provide the opportunities for reflection on learning during and after experiences and this will be an integral component of the learning outcomes. This approach will lead the student to be able to analyse, apply critical thinking, and synthesise.

The programme will engage the learners intellectually, emotionally and/or physically, which produces a perception that the learning taking place is authentic.

The programme will promote real work-type relationships and will promote communications between the students and peers, management and other stakeholders.

The programme will have an embedded culture of safety

The Lakes Colleges West Cumbria Teaching, Learning and Assessment Strategy has been developed in line with the University's Learning, Teaching and Assessment Strategy 2024-27.

College-based learning is the predominant experience with attendance at all scheduled sessions seen as imperative to student progression. This is further enhanced by the use of 'virtual learning environments' (VLE) for example CANVAS where each module studied has a designated CANVAS site providing not only standard lecture and practical material but supplementary reading, virtual exercises and the capacity for online forums. The utilisation of VLE allows for flexibility in learning whereby materials may be accessed at an individual's convenience on site or via remote access.

In addition to the experiential experience previously discussed, a variety of other learning and teaching methods will be used to both reflect the variety of learning styles that inevitably exist within a group and ensure the acquisition and development of appropriate concepts, knowledge and skills. This will enable students to experience teaching methods best suited to their own preferred learning style. As previously identified, work readiness is key to this programme and enhancing employability is a core theme throughout the programme. Therefore the learning and teaching methods are designed to support the move to autonomy and independent learning. Learners are expected and encouraged to be reflective in their learning and as such the strategies adopted focus on deep and experiential learning and typically include:

Lectures

laboratory classes and virtual reality experiences

individual and group tutorials

the utilisation of case studies

seminars and workshops

directed and independent study involving electronic resources (VLE), textbooks and other self-study materials

problem-based learning

training and practice in the use of IT and software packages

project work, both individually and in teams

reading and interpreting research publications

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Independent Learning

When not attending scheduled learning activities you will be expected to continue learning independently through self-study.

Teaching Staff

At present, the expertise within the Lakes College West Cumbria Higher Engineering, Science and Nuclear can be found within:

- Control Engineering, Instrumentation and Electrical Power Systems
- Robotics

- Radiological Science and Nuclear Decommissioning
- Electrical Design and Embedded Systems
- Nuclear Plant and Operations
- Mechanical Engineering and Design
- Nuclear Physics
- 3D Modelling and CAD
- Civil Engineering Structures and Modelling
- Building Asset Management

The Team has many years of industrial experience particularly in the nuclear industry. The delivery team will also be supported by keynote lectures from existing industrial experts providing further vocational context.

The delivery team are also regularly involved in scholarly activity relating to nuclear project developments, which are supported by regular development meetings with industrial practitioners. These meetings enable essential industrial development knowledge and case studies to be presented during the delivery of the courses.

Some members of the team have been actively involved with the nuclear industry in terms of consultation and implementation projects. These include:

- Commissioning of a Nuclear Plant (industrial project)
- Decommissioning of building and Processes
- Commissioning an IPES and reverse engineering of control software (implementation)
- Petrochemical Plant Control Systems (Consultation)
- Designing a centralised DCS control room within a petrochemical plant (consultation)
- Maximising efficiency of a Food Manufacturing Plant Control System (Consultation)
- Managing the Inventory of spent fuel (advisory)
- Commissioning electrical drive systems within a nuclear plant (advisory)

Assessment

Assessment Strategy

The assessment strategy has been developed to be in line with the University's Learning, Teaching and Assessment Strategy 2024-27.

The main drivers of this strategy are to:

- provide innovative, challenging and stimulating assessment which will enable you to develop the knowledge and professional skills required for employment.
- be student-centred, flexible and modern in both content and approach.
- be fully supported by, and integrated with technological approaches such as the CANVAS virtual learning environment (VLE).
- impart academic rigour to the teaching and learning processes.

- support the development of independence, autonomy and self-reflection.
- support learners' needs at different stages of development.

Within a balanced scheme, assessment methods will include:

- unseen examinations
- laboratory work and reports
- Dissertation
- Demonstration of Continuous Professional Development (Portfolio)
- computer-based assessments
- problem solving exercises (both of a practical and written format)
- analyse case studies to demonstrate knowledge and understanding
- oral, audio-visual and poster presentations
- group work

Formative assessment is also used extensively throughout the programme. Whilst elements of assessment will test knowledge and ability, the emphasis is on a more developmental approach to building the knowledge and skills utilised within employment. Formative assessment will involve the student being actively engaged in the assessment to encourage them to think about the learning process, to develop an ability to learn independently and to develop employability skills. It will also be used to evaluate teaching.

Personal development and reflective practice will take place throughout the programme and will be implemented through the wide range of activities (both formative and summative) as well as via the interaction with the Apprenticeship Training and Development Coach.

An important aspect of this higher education programme is the development of the student's independence and ability to learn from experience (LFE), which is a key behavioural requirement of the nuclear industry. These skills will be developed through research/dissertation, investigative practical work and portfolio building with reflective analysis. This reflective analysis and associated experiences will also develop critical thinking thought processes with some assessment requiring students to summarise their work with a critical review of their experience

Overview of the methods of assessment used on the programme within each year of study

<u>Year 1</u>

Unseen examinations

Practical and Radiological Laboratory work

Robot Programming

Team exercises

<u>Year 2</u>

Poster and Presentation

Dissertation Report

VIVA and Presentation

Feedback

Verbal and/or written feedback will be provided to learners within 20 working days of the assessment hand in deadline. This feedback will be designed to provide opportunities for learner reflection and improvement. All assessments will be in line with the University of Cumbria Academic guidelines.

Graduate Prospects

The programmes meet the immediate demand for Technicians and Engineers in key skill shortage areas as identified within the Government Nuclear Skills Strategy paper. Technical skills at levels 4 to 6 are in short supply with a particular emphasis within the paper identifying requirements for:

Decommissioning and Waste Management Supervisors

Technical Operational Leads

Quality Managers

Environmental and Waste Managers

Nuclear Clean-up Specialists

The programmes also address some of the technical skill requirements for current nuclear projects within the commissioning of new plants and technology to enable new and advanced decommissioning and infrastructure activities to take place whilst also dealing with legacy and future waste considerations. All these projects require infrastructure development and general mechanical and electrical design work. Sellafield Sites Limited operates a very large facility within West Cumbria which includes several legacy buildings which require asset managed to ensure compliance to the NNI.

Decommissioning and waste management and Infrastructure development is key within the current strategy of the NDA and underpinning these areas are innovative scientific solutions at all levels. An additional theme is the need for safe working environments and sustainability through the continuous monitoring and evaluation of radioactive environments and safety cases. These programmes will support the sustainability of recruitment within the nuclear industry, particularly managing the requirement for staff who will have relevant Level 5-6 qualifications.

Therefore, there are upskilling opportunities for employers and the scope for graduates to register with the Engineering Council and enhance their career opportunities both within their existing employment or for students who do not have employment within the sector, to gain sustainable and well-paid employment.

These unique courses of academic and work-based elements have been designed to provide individuals who require higher education qualifications with an opportunity to study locally and also gain credit for real work activities.

MODULES

Year 1			
Code	**Title**	**Credits**	**Status**
NUCL6029	Radioactive Waste Storage and Environmental Impact	20	Compulsory
NUCL6030	Robotics Systems, Configuration and Programming	20	Option
NUCL6026	Radiological Measurement and Safety Case Development	20	Option
NUCL6025	Quality Management	20	Option
NUCL6027	Site Decommissioning, Decontamination and Remediation	20	Compulsory
NUCL6028	Professional Development	20	Core
Students exiting at this point with 60 credits would receive an Ordinary Degree in Decommissioning and Waste Management			

Year 2			
Code	**Title**	**Credits**	**Status**
NUCL6037	Industrial Based Dissertation (Non-Apprenticeship)	40	Core

Students exiting at this point with 120 credits would receive a BEng (Hons) Decommissioning and Waste Management

You may be awarded the following Exit Award if you fail to achieve the requirements of the full programme.

- **BEng Decommissioning and Waste Management**

Ordinary degrees can only be awarded as an exit award where you have undertaken a minimum of 60 Level 6 credits of taught studies from the Top Up programme.

Key to Module Statuses	
Core modules	Must be taken and must be successfully passed.
Compulsory modules	All modules must be taken although it may be possible to compensate as a marginal fail (within the limits set out in the Academic

	Regulations and provided that all core or pass/fail elements of module assessment have been passed). The Engineering Council regulations for professional registration requires that a maximum of 30 credits of compensation is allowed across a full 360 credit degree but with a maximum of 10 credits of compensation at level 6. The honours degree has modules of a minimum size of 20 credits, therefore for registration purposes no level 6 modules can be compensated.
Optional modules	Are a set of modules from which you will be required to choose a set number to study. Once chosen, it may possible to compensate as a marginal fail (within the limits set out in the Academic Regulations and provided that all core or pass/fail elements of module assessment have been passed). The Engineering Council regulations for professional registration requires that a maximum of 30 credits of compensation is allowed across a full 360 credit degree but with a maximum of 10 credits of compensation at level 6. The honours degree has modules of a minimum size of 20 credits, therefore for registration purposes no level 6 modules can be compensated.

Timetables
Two-year programme based on four semesters. Each year will be timetabled with eight block weeks, starting in January. Each year block delivery will include: February – Block 1

March – Block 2

April – Block 3

May – Block 4

Sept – Block 5

October – Block 6

November – Block 7

December – Block 8

ADDITIONAL INFORMATION

Student Support
Learning Resource Centre (LRC) and Student Services Library and Student Services (LRC) offer a wide range of support, including access to library learning resources, academic skills, careers and employability, financial help, counselling, health and wellbeing and support for disabled students and those with specific learning requirements. We know that you want to get the most out of your programme, make the best use of your time and find or continue in the career you always dreamed of. Module leaders will collaborate with LRC advisers to ensure that your reading lists are current, and items are available via the library collections. In order to maximise access, availability and usefulness, eBooks and electronic journal titles will, in most cases, be prioritised. Where appropriate, module reading lists will be made available to you electronically using the College's CANVAS pages. Course Representatives Course representatives are invited to attend Staff/Student Liaison Meetings and other similar meetings to discuss any issues of concern in order to improve the quality of the teaching and to enhance your learning experience. One course representative from all the HE courses can be elected as a learner governor on the governing body of the College. Employability Lakes College aims to deliver accessible, flexible and quality assured programmes that provide academic inspiration and challenge, and support excellence. The courses are designed with a strong vocational focus and emphasis is given to the development of core professional and transferable skills to enhance employability. As such, a wide range of transferable skills are covered. These include: Communication Group work Problem solving Use of information technology Student Support Between Block Release Between delivery students will have access to a range of additional support mechanisms which will include: Access to a virtual learning environment (CANVAS) with supporting learning materials for each module which will include; case study materials, practice examples, interactive tests, discussion board and direct access to the module tutor via an online share point. Access to the lakes College Learning Resource Centre which is open till 9.30 pm (Monday to Thursday) and the specialist HE Section for quiet study within the LRC.

Drop in support sessions will be provided for learners between block weeks to provide to meet individual needs relating to specific module topic areas.

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Do students not have personal tutors?

Course Costs

Tuition Fees

Course fees are £6,000 per course, £4,000 for year 1 and £2,000 for year 2.

The following course-related costs are included in the fees:

- Registration Fees
- Course materials

Exceptions to the Academic Regulations

The Engineering Council regulations for professional registration requires that a maximum of 30 credits of compensation is allowed across a full 360 credit degree but with a maximum of 10 credits of compensation at level 6. The honours degree has modules of a minimum size of 20 credits, therefore for registration purposes no level 6 modules can be compensated.

External and Internal Benchmarks

QAA Benchmark statements for Engineering (March 2023): Link Subject Benchmark Statement: Engineering (qaa.ac.uk)

Engineering Council's Accreditation of Higher Education Programmes (AHEP4) in engineering, in line with the UK Standard for Professional Engineering Competence (UK-SPEC) – Competence Matrix for IEng is Further Learning – link Engineering Council (engc.org.uk)

National College for Nuclear – Course Structure Guidance

Nuclear Institute and Nuclear Delta: Link Nuclear Delta (nuclearinst.com)

Disclaimer

This programme has been approved (validated) by the University of Cumbria as suitable for a range of delivery modes, delivery patterns, and delivery sites. This level of potential flexibility does not reflect a commitment on behalf of the University or Lakes College to offer the programme by all modes/patterns and at all locations in every academic cycle. The details of the programme offered for a particular intake year will be as detailed on the programme webpage.